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PTO/SB/05 (4/98)  
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<b>UTILITY PATENT APPLICATION TRANSMITTAL</b> (Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))		Attorney Docket No.	P04255US0
		First Inventor or Application Identifier	Brian W. Carr. et al.
		Title	METHOD FOR IDENTIFYING THE IDENTITY OF A GROWING OR GROWN..
		Express Mail Label No.	EL327120835US

<b>APPLICATION ELEMENTS</b> See MPEP chapter 600 concerning utility patent application contents.		<b>ADDRESS TO:</b> Assistant Commissioner for Patents Box Patent Application Washington, DC 20231	
1. <input checked="" type="checkbox"/> * Fee Transmittal Form (e.g., PTO/SB/17) (Submit an original and a duplicate for fee processing)		5. <input type="checkbox"/> Microfiche Computer Program (Appendix)	
2. <input checked="" type="checkbox"/> Specification [Total Pages 6] (preferred arrangement set forth below) - Descriptive title of the Invention - Cross References to Related Applications - Statement Regarding Fed sponsored R & D - Reference to Microfiche Appendix - Background of the Invention - Brief Summary of the Invention - Brief Description of the Drawings (if filed) - Detailed Description - Claim(s) - Abstract of the Disclosure		6. <input type="checkbox"/> Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary) a. <input type="checkbox"/> Computer Readable Copy b. <input type="checkbox"/> Paper Copy (identical to computer copy) c. <input type="checkbox"/> Statement verifying identity of above copies	
3. <input checked="" type="checkbox"/> Drawing(s) (35 U.S.C. 113) [Total Sheets 3]		<b>ACCOMPANYING APPLICATION PARTS</b> 7. <input type="checkbox"/> Assignment Papers (cover sheet & document(s)) 8. <input type="checkbox"/> 37 C.F.R. § 3.73(b) Statement <input type="checkbox"/> Power of Attorney (when there is an assignee) 9. <input type="checkbox"/> English Translation Document (if applicable) 10. <input type="checkbox"/> Information Disclosure Statement (IDS)/PTO-1449 <input type="checkbox"/> Copies of IDS Citations 11. <input type="checkbox"/> Preliminary Amendment 12. <input checked="" type="checkbox"/> Return Receipt Postcard (MPEP 503) (Should be specifically itemized) 13. <input checked="" type="checkbox"/> * Small Entity Statement(s) <input type="checkbox"/> Statement filed in prior application, Status still proper and desired (PTO/SB/09-12) 14. <input type="checkbox"/> Certified Copy of Priority Document(s) (if foreign priority is claimed) 15. <input checked="" type="checkbox"/> Other: Express Mail Label No. EL327120835US	
4. Oath or Declaration [Total Pages 4] a. <input checked="" type="checkbox"/> Newly executed (original or copy) b. <input type="checkbox"/> Copy from a prior application (37 C.F.R. § 1.63(d)) (for continuation/divisional with Box 16 completed) i. <input type="checkbox"/> <b>DELETION OF INVENTOR(S)</b> Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).			
<b>* NOTE FOR ITEMS 1 &amp; 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).</b>			

16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: \_\_\_\_\_

Prior application information: Examiner \_\_\_\_\_ Group / Art Unit: \_\_\_\_\_

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS

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Signature	<i>Donald H. Zarley</i>	Date	Nov. 1, 1999

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Applicant or Patentee: Brian W. Carr, Peter B. Moore, Donald F. Handorf and Timothy A. Schroeder  
Serial No. or Patent No: \_\_\_\_\_  
Filed or Issued: \_\_\_\_\_  
For: METHOD FOR IDENTIFYING THE IDENTITY OF A GROWING OR GROWN CROP IN A FIELD LOCATION

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY  
STATUS (37 CFR 1.9(f) AND 1.27(c)) - SMALL BUSINESS CONCERN**

I hereby declare that I am

- ☐ the owner of the small business concern identified below:  
☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN Gary W. Clem, Inc.

ADDRESS OF CONCERN 99 M Avenue, Box 296, Nevada, Iowa 50201

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled METHOD FOR IDENTIFYING THE IDENTITY OF A GROWING OR GROWN CROP IN A FIELD LOCATION by inventor(s) Brian W. Carr, Peter B. Moore, Donald F. Handorf and Timothy A. Schroeder, described in

- ☒ the specification filed herewith.  
☐ application Serial No. \_\_\_\_\_, filed \_\_\_\_\_  
☐ Patent No. \_\_\_\_\_, issued \_\_\_\_\_

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights in the invention is listed below\* and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

*\*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27).*

FULL NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of payment, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME AND TITLE OF PERSON SIGNING Brian W. Carr, Vice President

ADDRESS OF PERSON SIGNING 99 M Avenue, Box 296, Nevada, Iowa 50201

SIGNATURE Brian W. Carr

DATE 10/28/99

INVENTORS: BRIAN W. CARR  
PETER B. MOORE  
DONALD F. HANDORF  
TIMOTHY A. SCHROEDER

TITLE: METHOD FOR IDENTIFYING THE IDENTITY OF A  
GROWING OR GROWN CROP IN A FIELD LOCATION

#### BACKGROUND OF THE INVENTION

Research plots for field crops are normally set up in a grid style layout comprised of a plurality of short rows of crops located in a plurality of ranges distributed across an x-y grid. Plot numbers or identifiers are assigned to each corresponding plot in the field. It is important for the research scientist to observe individual ranges, individual rows, and sometimes even individual plants. It is sometimes very difficult for the research scientist to know which exact plot or plant is being observed. It is critical to know this information when notes are taken so that the corresponding data is correctly associated. Plot location is also very important at harvest. This is the final data retrieved from the field and it must correlate properly in the database for the field which is commonly used.

Some use of global positioning systems ("GPS") have been used to alleviate some of the problems of identification, however, the use of GPS has not been perfected to accommodate all of the needs of the research scientist in observing the growing and grown crops to gather the necessary data which the research requires.

It is therefore a principal object of this invention to use a GPS in conjunction with the planting process to permit a research scientist to specifically identify individual plants, rows, ranges and the like in gathering research data from the growing crop.

A further object of this invention is to use this GPS data at any time the scientist is in the field taking notes while the crop is growing, or during the harvest operation.

It is a further object of this invention to use a GPS data gathering system which will reduce the possibility of data corruption due to location error.

These and other objects will be apparent to those skilled in the art.

#### SUMMARY OF THE INVENTION

A GPS receiver is mounted on the planter to provide data on the plot start location. When the planter trip signal is received by the controller computer, it requests the longitude and latitude from the GPS receiver for the individual seed planted in a given row. This data is stored with the plot identifier. Each time a new plot starts, the data is recorded so that the entire grid is mapped out in start locations. During note taking or harvest, a GPS receiver is used to provide current longitude and latitude that the computer will look up in the data file and correlate to a particular plot identifier. Once the computer has matched the proper plot identifier, the note or harvest data can then be recorded with the proper plot identifier.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a research field for row crops;

Fig. 2 is an enlarged scale perspective view of the area outlined by lines 2-2 in Fig. 1;

Fig. 3 is an enlarged scale perspective view of a planter used to plant the field in Figure 1; and

Fig. 4 is a schematic diagram showing the implementation of the method of this invention.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

The numeral 10 designates a research field in which row crop seeds are planted for research purposes. The planting locations of each seed planted is designated by the numeral 12, and the plants resulting from the subsequent germination of the seeds are designated by the numerals 14.

The field 10 is divided into a plurality of plots 16 which are comprised of a plurality of parallel rows 17. The plots are located in a series of parallel ranges 18 which are separated by laterally extending alleys 20 (geometrically in an "x" direction) and a series of longitudinal alleys 22 (geometrically in a "y" direction). Alleys 20 and 22 are typically at right angles to each other.

When the field 10 is planted, a conventional farm tractor 24 and a research planter 26 are used. Separate packets of seed are typically planted in each row 17 in each plot 16. The planter 26 includes a computer 28 which is operatively connected by conventional means to a GPS receiver 30 so that as each seed is deposited in the soil of a row, a global position of the planted seed is instantaneously determined. This data is entered in the memory of computer 28 along with the range number of the plot, the number of the plot, the number of the row of the plot, and the number ("A", "B", "C", . . . "F" - Fig. 4) of the seed in the row, all with an identification of the seed that was planted at the identified location.

The research planter 26 can have a sensor (not shown), e.g., a photocell, to monitor the dropping of each seed whereupon a signal is transmitted to the computer 28 or GPS 30 to trigger a location reading to be stored in the memory of the computer. More specifically, when the first plot is manually tripped, the computer 30 uses vector information and determines the next tripping location. The computer 30 has a program that allows entry of data as to the row length and alley width so that the system could calculate the next plot location from the original planter trip. An additional parameter is entered into the program to include the number

of trips needed to make a pass across the field and the number of passes that would be needed to complete the planting grid. This system maintains accuracy to around 2 inches. Systems other than GPS could be used to attain this information. Examples would be radio, sonar or laser. Longitude and latitude on earth are not fully needed for this function. Displacement or distance from the original location is what will drive the tripping.

After the plants 14 have emerged, or when the plants have matured and harvesting is imminent, the research scientist 32 (Fig. 4) will examine the field and will, among other things, visually examine the plants in the field to find plants with characteristics that are the object of the research being conducted. Upon finding a plant 14 upon which data is to be gathered, (e.g. plant "F" - Fig. 4) the scientist will place a GPS receiver 34 over or adjacent to the plant in question. The longitude or latitude of that plant will be determined, and then transmitted either by signal to a remotely located PC 36, (which also could be a hand-held PC) in which is stored the planting location data described above taken when the field was planted. The incoming longitude and latitude for GPS receiver 34 will be matched with the similar reading stored in PC 36 whereupon the person 32 will have access to the data on plant F for entry in the field notes.

It is therefore seen that the foregoing method will permit accurate and immediate access to the full data, including location and identification, of any given plant in a research field of any size as the scientists observe and evaluate the plants while they are growing or after they matured. This achieves all the objectives of this invention.

What is claimed is:

1.

A method for identifying the identity of a growing or grown crop in a field location, comprising, planting a crop in a field in separate plots, determining the longitude and latitude planting data of each plot on or before the time the crop is planted, and storing the longitude and latitude data, and the crop identification data for each plot in memory storage, selecting a plot and determining the longitude and latitude location data thereof after the crop has started to grow, comparing and matching the longitude and latitude location data with the longitude and latitude planting data to identify the crop in the plot from which the location data was determined.

2.

The method of claim 1 wherein the determination of the longitude and planting data includes the latitude and longitude of each seed planting location within the plots so as to permit the recording of data of individualized plants within the plot and the recovery and identification of the planting data including location of each plant.

3.

The method of claim 2 wherein the identification of longitude and latitude planting and location data is accomplished by a global positioning system.

4.

The method of claim 1 wherein the selection of a plot is done while the crop is growing.

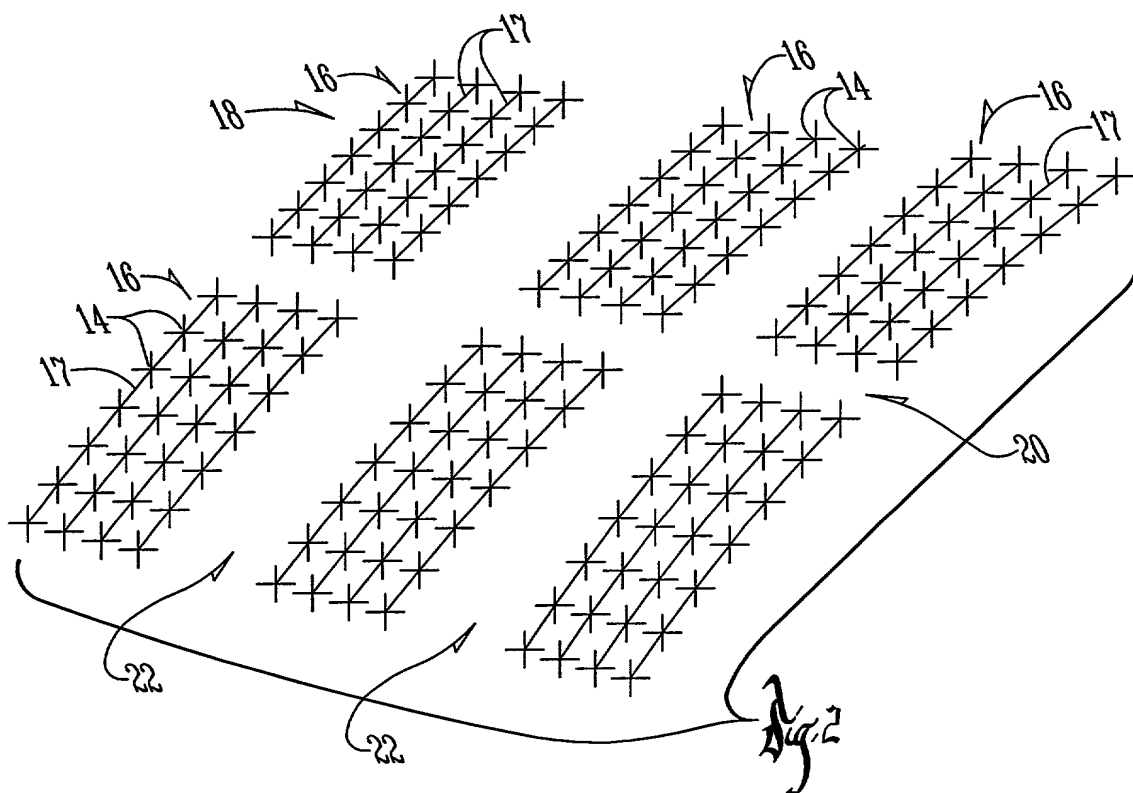
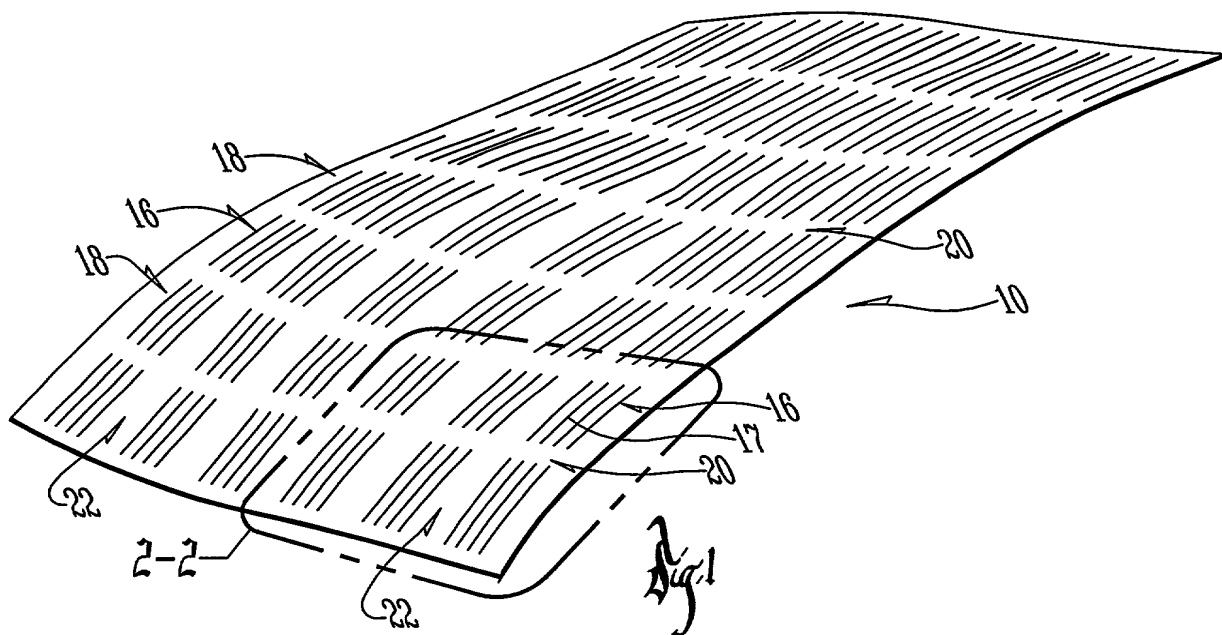
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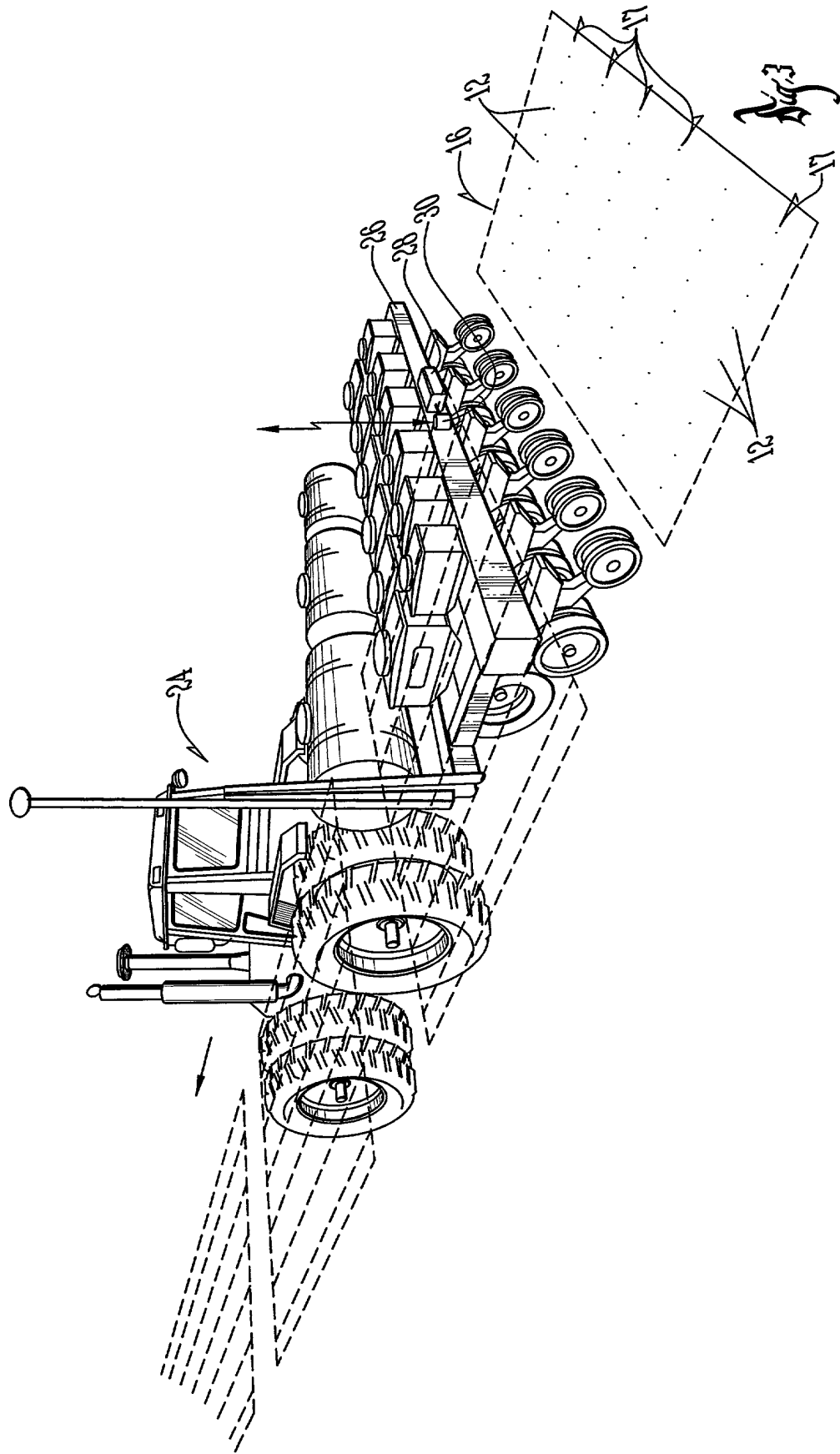
The method of claim 1 wherein the selection of a plot is done when the crop has matured.

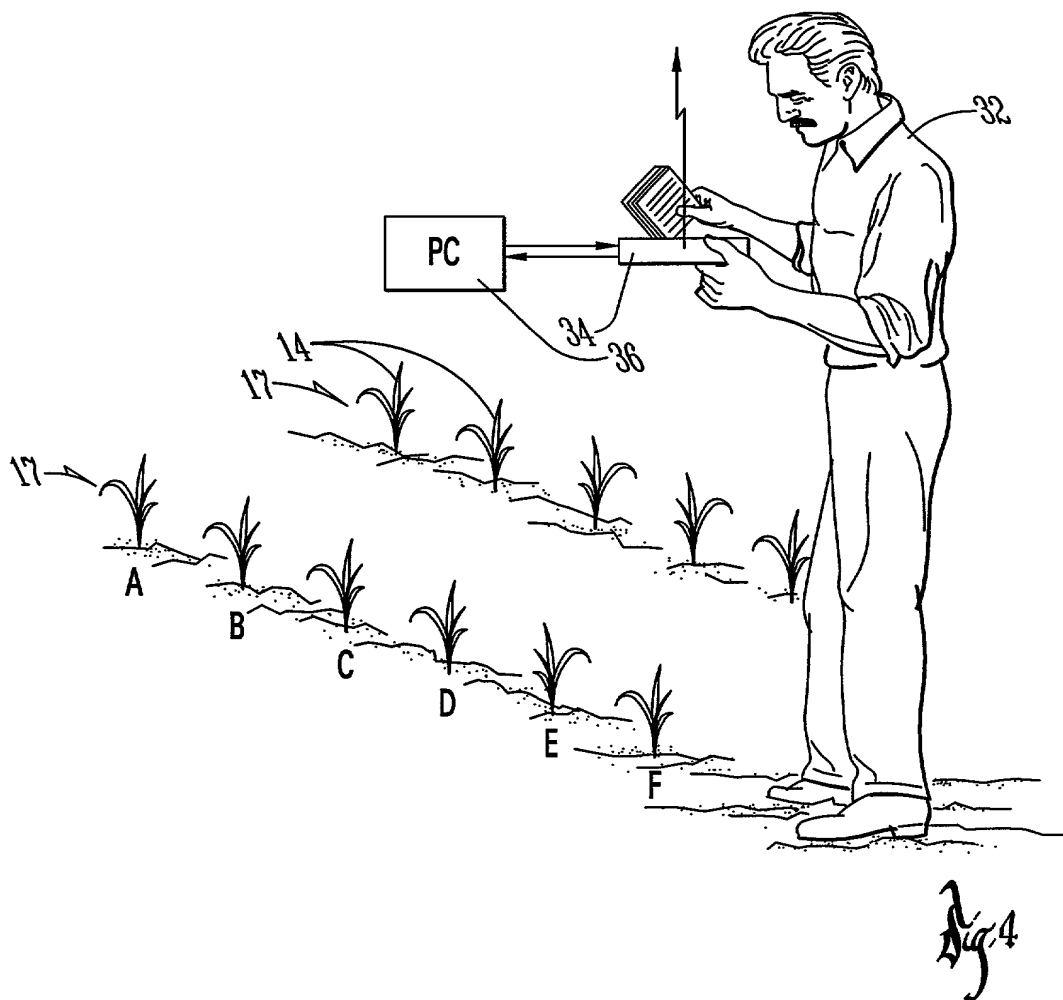
#### ABSTRACT OF THE DISCLOSURE

A GPS receiver is mounted on the planter to provide data on the plot start location. When the planter trip signal is received by the controller computer, it requests the longitude and latitude from the GPS receiver for the individual seed planted in a given row. This data is stored with the plot identifier. Each time a new plot starts, the data is recorded so that the entire grid is mapped out in start locations. During note taking or harvest, a GPS receiver is used to provide current longitude and latitude that the computer will look up in the data file and correlate to a particular plot identifier. Once the computer has matched the proper plot identifier, the note or harvest data can then be recorded with the proper plot identifier.









IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

COMBINED DECLARATION AND POWER OF ATTORNEY

FOR JOINT INVENTORS

As the below named coinventors, we hereby declare that:

Our residences, post office addresses and citizenships are as stated below next to our names. We believe we are the original, first and joint inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled as follows: METHOD FOR IDENTIFYING THE IDENTITY OF A GROWING OR GROWN CROP IN A FIELD LOCATION, the specification and drawings of which are attached hereto.

We hereby state that we have reviewed and understand the contents of the above identified specification and drawings, including the claims, as amended by any amendment referred to above.

We acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code Of Federal Regulations, Section 1.56. We further declare that no application for patent or inventor's certificate on this invention has been filed by us, our legal representatives or assigns in any country foreign to the United States of America except as identified below:


NONE.

And we hereby appoint ZARLEY, McKEE, THOMTE, VOORHEES & SEASE, comprising Donald H. Zarley, Registration No. 18,543; Bruce W. McKee, Registration No. 19,651; Dennis L. Thomte, Registration No. 22,497; Michael G. Voorhees, Registration No. 25,715; Edmund J. Sease, Registration No. 24,741; Mark D. Hansing, Registration No. 30,643; Kirk M. Hartung, Registration No. 31,021; Daniel J. Cosgrove, Reg. No. 36,770; Michael R. Crabb, Registration No. 37,298; Heidi Sease Nebel, Registration No. 37,719; Wendy K. Marsh, Registration No. 39,705; Jeffrey D. Harty, Registration No. 40,639; James A. Napier, Registration No. 42,025; Mark Ziegelbein, Registration No. 43,307; Patricia L. Ades, Registration No. 44,496; and Timothy J. Zarley, Registration No. P-45,253; 801 Grand Avenue, Suite 3200, Des Moines, Iowa 50309-2721, Telephone 515-288-3667, our attorneys to prosecute this application and to transact all business in the Patent Office connected therewith.

We hereby declare that all statements made herein are of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable

by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

**SIGNATURES**

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